

National Aeronautics and Space Administration



NASA/JAXA Exploration Collaboration Team F2F

Space Launch System



August 28 - 29, 2013



NASA/JAXA F2F

Agenda – Wednesday, August 28th

7:45	JAXA Visitor Pick-up @ Holiday Inn Express & Suites/Huntsville and Hampton Inn & Suites/Huntsville/Research Park	Escorts
8:00	Visitor Badging @ RSA Visitors Center	Escorts
9:00-9:30	Welcome/Introductions/Meeting Objectives	Creech & Kobayashi
9:30-9:45	SLS Program Progress Update	Creech
9:45-10:00	JAXA H-X Recent Activities	Kobayashi
10:00-12:00	Study Plan	Greene/JAXA
12:00-1:00	Lunch @ 4203 Cafeteria	All
1:00-1:30	JAXA Isp Trade	JAXA
1:30-2:00	NASA Proposal of H-X Flight Test Opportunity	Crumbly
2:00-3:00	Propulsion Components Approach Planning	Devine/JAXA
3:00-3:30	Management Plan	Smith/JAXA
3:30-5:00	Splinter Working Sessions	All
5:00	Adjourn Day 1	All
6:30	Group Dinner @ Below the Radar	All



8:00	JAXA Visitor Pick-up @ Holiday Inn Express & Suites/Huntsville and Hampton Inn & Suites/Huntsville/Research Park	Escorts
8:30-9:30	Splinter Session Outbriefs	
9:30-12:00	Splinter Sessions	All
12:00-1:00	Lunch @ 4203 Cafeteria	All
1:00-3:00	Tours <i>(West Test Area Engine Test Stand; East Test Area: TS116 (SMAT), 4550; 4705 (EFT-1 MSA))</i>	All
3:00-3:30	Wrap-up and Adjourn	All
3:30	Return JAXA Visitors to Holiday Inn Express & Suites/Huntsville and Hampton Inn & Suites/Huntsville/Research Park	Escorts



SLS Program Progress Update

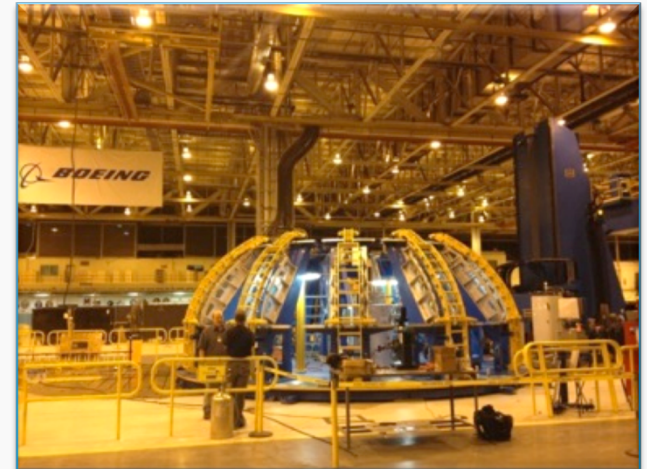
Recent Progress



April

- Exploration Systems Development Cross-program System Definition Review Complete
- J-2X Development Engine 10002 Hot Fire Testing Complete in A-2 Test Stand
- Stage Tank Enhanced Ring Weld Tool and Gore Weld Tool Installation Complete at MAF
- RS-25 Preliminary Program Support Checkpoint Complete
- SLS Block I (EM-1/-2 Configuration) Booster Contract Definitized

Gore Weld Tool



May

- Stennis Space Center Test Stand A-1 Reconfiguration and Thrust Vector Control Installation Complete



J-2X Engine Testing Continues

Recent Progress (cont'd)



June

- RS-25 Engine Controller Unit and Software Preliminary Design Review Complete
- Vertical Weld Center Tool Installation Complete at MAF
- SLS Block I Booster Integrated Baseline Review Complete
- J-2X Development Engine 10002 Test in A-1 Test Stand
- First J-2X Development Engine Gimbal Test
- MPCV-to-Spacecraft Adapter Fit Check
- SPIO Preliminary Design Review Complete
- Stages Vertical Assembly Center Foundation Installation Complete, Start Cure at MAF

**J-2X
Engine
Testing**



**Spacecraft Adapter
Ring Fit Check**



**Segmented Ring Tool
for Core Stage
Construction**

Recent Progress (cont'd)



July

- J-2X Development Engine 10002 Test on A-1 Test Stand
- First Core Stage Barrel Panel Welded at MAF
- GSDO Command, Control, Communications, and Range Integrated Program Review Readiness Assessment Complete
- 2014 EFT-1 MSA Delivered to MSFC
- ***SLS Preliminary Design Review Complete***

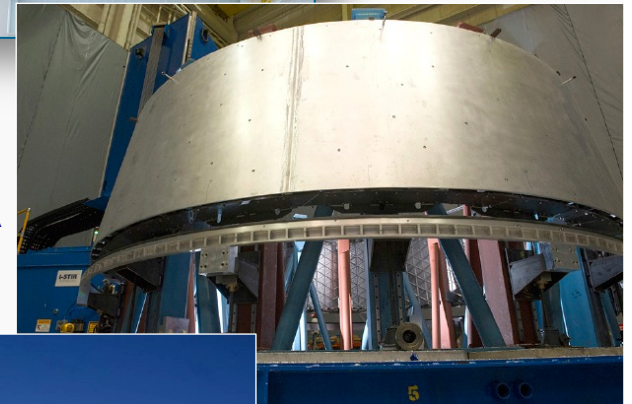


**First Core Stage
Barrel Panel
Welded at MAF**

August

- J-2X Development Engine 10002 Hot Fire Testing in A-1 Test Stand Continues;
Development Engine 10003 in Final Assembly
- SLS Block I Core Stage Engine Contract Definitized

EFT-1 MSA



**J-2X Testing
Continues**

A photograph of a Space Shuttle SLS (Space Launch System) being launched. The shuttle is white with blue and red markings, including the NASA logo. It is ascending vertically, leaving a large, bright orange and yellow plume of fire and white smoke at its base. To the left of the shuttle is a tall, silver metal service tower. In the foreground, there are several large, horizontal, silver pipes with green markings that read "N2O4" and "400 PSI". The background is a blue sky with scattered white clouds.

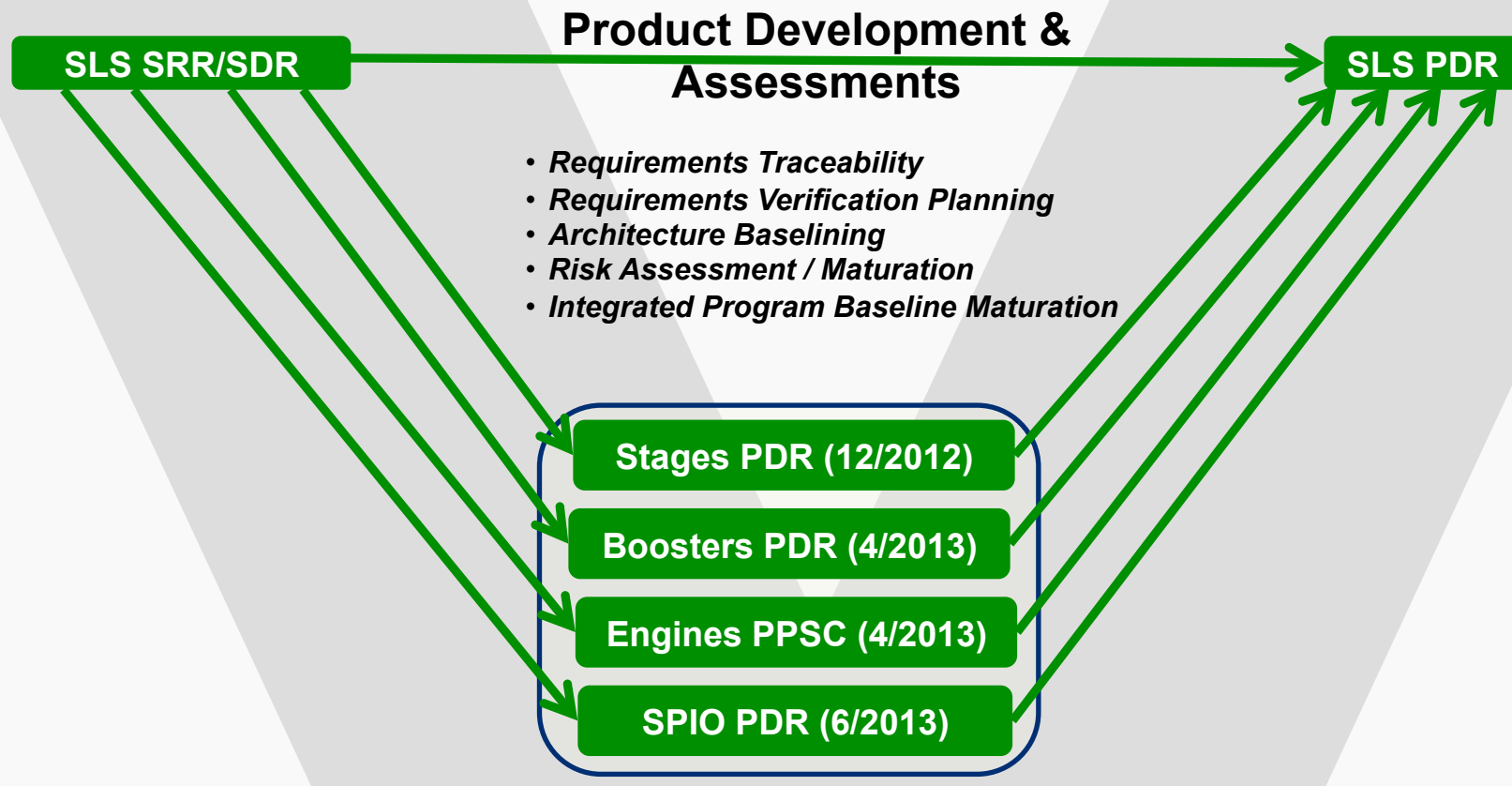
SLS Preliminary Design Review Complete

SLS Program Life Cycle



NASA Life Cycle Phases	Approval for Formulation 		FORMULATION		Approval for Implementation 	IMPLEMENTATION	
Program Life Cycle Phases	Pre-Phase A: Concept Studies	Phase A: Concept & Technology Development	Phase B: Preliminary Design & Technology Completion	Phase C: Final Design & Fabrication	Phase D: System Assembly, Int. & Test, Launch & Checkout	Phase E: Operations & Sustainment	Phase F: Closeout
Program Life Cycle Gates and Major Events	KDP A   FAD   Draft Project Requirements  	 Preliminary Program Plan	KDP B   Draft PCA    Baseline Program Plan	KDP C  Final PCA 	KDP D  Launch 	KDP E  End of Missions 	KDP F  Final Archival of Data 
Agency Reviews	ASM  			WE ARE HERE			
Human Space Flight Project Reviews	MCR  	 SRR/SDR Steps 1 & 2 	PDR  	CDR  DCR 	SIR (pre-)FRR 	PLAR 	DR 

SLS Element PDRs



- ◆ Element-level PDRs aligned with Program-level PDR
- ◆ Element PDR data integrated into Program PDR

SLS Design Is Technically Sound



- ◆ From Concept to Preliminary Design in Less Than 2 Years
- ◆ Ready to proceed to Implementation (Phase C) following Key Decision Point (KDP-C) approvals
 - Marshall Space Flight Center Management Council (CMC)
 - Human Exploration and Operations Mission Directorate Program Management Council (DPMC)
 - Agency Program Management Council (APMC)



“Stack it. I’m ready.”
— Tony Antonelli, JSC Crew Office

A photograph of the Space Shuttle Columbia being launched from the launch pad. The shuttle is white with blue and red markings, and it is surrounded by a large plume of white smoke and orange fire. A tall metal service tower is visible on the left, and a large pipe labeled 'N2O4 400 PSI' is in the foreground. The text 'Potential H-X Flight Demonstration Opportunities' is overlaid on the right side of the image.

Potential H-X Flight Demonstration Opportunities

Potential Demonstration Opportunities



Options for H-2 or H-X Flight Tests

- Liquid acquisition device (US or Japanese)
- Advanced cryoinsulation
- Liquid measurement sensors (settled/unsettled)
- Active/passive thermal venting
- Demonstration of low propellant engine restart
- Demonstration/instrumentation of metallic nozzle extension
- Other?